LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

Report of Captain A. Mackenzie, Corps of Engineers, of survey of Cuivre River, Missouri.

JANUARY 12, 1880.—Referred to the Committee on Commerce and ordered to be printed, with accompanying documents.

WAR DEPARTMENT,
Washington City, January 10, 1880.

The Secretary of War has the honor to transmit to the United States Senate a letter from the Chief of Engineers, dated the 8th instant, and accompanying copy of report from Capt. A. Mackenzie, Corps of Engineers, of an examination and survey of Cuivre River, Missouri, made in compliance with the requirements of the river and harbor act of March 3, 1879.

ALEX. RAMSEY,
Secretary of War.

The PRESIDENT
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
Washington, D. C., January 8, 1880.

SIR: I have the honor to submit herewith a copy of a report to this office from Capt. A. Mackenzie, Corps of Engineers, of the results of an examination and survey of Cuivre River, Missouri, made under his direction, to comply with requirements of the river and harbor act of March 3, 1879.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen., U. S. A.

Hon. ALEXANDER RAMSEY,
Secretary of War.

EXAMINATION AND SURVEY OF CUIVRE RIVER, MISSOURI.

UNITED STATES ENGINEER OFFICE.
Rock Island, Ill., December 29, 1879.

GENERAL: I have the honor to submit herewith map of Cuivre River, Missouri, together with a report upon the survey and examination of

this stream, made in accordance with your instructions dated July 25, 1879.

A preliminary examination of the river showed that a point known as "Chain of Rocks," 14½ miles from the mouth of Cuivre River, might be properly considered as the head of navigation.

From this point to the mouth a good depth of water was found in the stream, excepting at four points, where gravel bars formed obstructions to navigation during ordinary stages.

Cuts through these gravel bars 80 feet wide, and averaging 2 feet deep, and the removal of snags, will render the river navigable for boats drawing 4 feet at ordinary stages of low water.

From the character of the stream, its banks and bed, and the absence of all current except in times of freshets, it can be assumed that the improvement of the river proper would be reasonably permanent.

The river empties into Cuivre Slough, which connects it with the main channel of the Mississippi River.

This slough being filled with moving sand, and fresh supplies of sand above being ready to move in during high water, its improvement presents difficulties, and permanency cannot be insured.

The plan of improvement proposed is by a dam at the lower end of the slough, to raise the water at the mouth of the river about 1 foot, and by doing away with current through slough at ordinary stages of the river, to enable a dredge to cut a channel through the thin bars in upper branch of slough, which channel will probably be permanent until the next high water following the improvement.

To insure a permanent channel a little dredging must be provided for yearly. The approximate cost of the improvement of the river and slough so as to give 4 feet of water at a 2-foot stage is $30,000.

A very rich country is tributary to the river, and undoubtedly much good would result from its improvement; but as no reliable statistics could be obtained, it is impossible to give more than an approximate comparison of results, with the cost.

The detailed report of Assistant Engineer C. H. Durham is appended.

Very respectfully, your obedient servant,

A. MACKENZIE,
Captain of Engineers.

The CHIEF OF ENGINEERS, U. S. A.

REPORT OF MR. C. W. DURHAM, ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE.
Rock Island, Ill., December 24, 1879.

CAPTAIN: I have the honor to present the following report and accompanying map of a survey of the Cuivre River, Missouri, made, under your direction, by Assistant J. H. Morrison, November, 1879. The report includes a plan and estimate for the improvement of the river from Chain of Rocks to its mouth, a distance of 14½ miles, and also for the improvement of the slough into which it debouches, in order to make a navigable outlet to the main channel of the Mississippi River. I have made use of much information contained in the excellent report of Mr. A. H. Blaisdell, assistant engineer, on a survey of this river made by him under direction of Lieut. Col. W. F. Reynolds, Corps of Engineers, August, 1871, which report may be found in the Report of the Chief of Engineers for 1872, page 391.

DESCRIPTION.

The Cuivre River is formed by the junction of the North and West Forks, the former rising in Ralls and the latter in Audrain County. Both forks are augmented by numerous small streams, which scarcely deserve the name of creeks in the

dry season, but in times of continued rain, flowing as they do from the high bluffs, they become turbulent in their character and bring considerable sediment into the stream to which they are tributary. The general trend of the river is easterly, through Lincoln and Saint Charles Counties, pursuing, however, a very tortuous and winding course, with many sharp bends and elbows. The total drainage area is about 1,600 square miles.

MOSCOW MILLS TO CHAIN OF ROCKS.

The upper portion of the river from Moscow Mills to Chain of Rocks is full of shoals and narrow passages or island chutes, with insufficient water at low stages to float a skiff. Great numbers of snags and drift piles also add to the difficulties of navigation, in view of which facts it was considered inadvisable to make plans and estimates for the improvement of this part of the river, as the business is not commensurate with the enormous cost which would result if any effectual improvement were attempted.

CHAIN OF ROCKS TO MOUTH OF RIVER.

The lower portion of the river from Chain of Rocks to its mouth is included within the scope of this survey, and for the improvement of this portion plans and estimates are submitted. It resembles in character the bayous of the Lower Mississippi and other Southern rivers there being no perceptible current except in times of freshets, its rise and fall corresponding with the fluctuations of water-surface in the larger river. It varies in width from 300 feet at mouth to 150 feet at Chain of Rocks.

A little below Chain of Rocks there is an excellent landing with ample depth of water. Passing down the river, we find a good channel of from four to nine feet at extreme low-water for about 1,000 feet, when Seed Tick Island Bar is reached.

Seed Tick Island Bar.—A reach of shallow water about 2,000 feet in length. A portion of this bar is dry at low-water, and the average depth is only a few inches. It forms the worst obstruction in that part of the river under consideration. From here to Flood's Bar, about half mile below Monroe, a distance of some four and a half miles, we find from 4½ to 18 feet of water.

Flood's Bar.—About 850 feet in length, with an average depth at low-water of about 1 foot. From here to Shelton Bar, a distance of nearly two miles, we have from 4 to 12 feet in the channel.

Shelton Bar.—A very shallow reach about 850 feet in length, situated in a bend of the river, and of an average depth of about six inches at low water, a great part of it being dry at that stage.

Morrison's Bar.—About 300 feet below Shelton Bar; 550 feet in length, and of an average depth at low-water of about six inches.

From Morrison's Bar to the mouth of the river, a distance of about eight miles, there is a good channel of from 4½ to 8 feet.

The bars above mentioned are composed of sand and gravel, material probably easily taken up by dredge.

CUIVRE SLOUGH.

The Cuivre River empties into the Mississippi River through Cuivre Slough, included between Cuivre Island (No. 504) and the Missouri shore. In the slough going *south* from the mouth of the river the water is very shoal and hardly susceptible of effectual improvement without great expense. Going *north* we find much better depth, there being, however, three shallow sand-bars which may be removed by dredge at inconsiderable cost. These are—

Cuivre Slough Bar No. 1. Near head of Cuivre Island, 700 feet long, and of an average depth at low-water of about 1 foot.

Cuivre Slough Bar No. 2. About 900 feet long; average depth, 1 foot.

Cuivre Slough Bar No. 3. Near mouth of Cuivre River; 850 feet long; average depth, about 9 inches.

With the exception of these bars, there is a good passage to the channel of the Mississippi River.

SNAGS.

There are a large number of snags in the channel between Chain of Rocks and the mouth of the river, and several in the upper part of Cuivre Slough. There is also considerable overhanging timber and a sunken barge a short distance below Monroe.

BRIDGES.

There is a skew draw-bridge of the Saint Louis and Keokuk Railroad near Monroe, with openings of 60 feet. There being no current in the river, the passage of the bridge can be safely made except in a high wind.

STATISTICS.

The country tributary to the river is thickly settled and in a high state of cultivation, the products being wheat, corn, hay, tobacco, and fruit. Large numbers of cattle and hogs are annually sent to market. There is a large business done in timber and cord-wood, cut on the bottom-lands adjacent to the river.

Coal and iron abound in Lincoln County. The principal shipping point is Chain of Rocks, a village of about one hundred inhabitants. At Monroe considerable traffic is carried on. It was impossible to obtain accurate statistics of the amount of shipments, no systematic record being kept by shippers.

PROJECT.

For the improvement of Cuivre River and Cuivre Slough, a minimum depth on the shoals of 2 feet at extreme low-water is assumed as the object desired. This will afford from 4 to 5 feet during the greater part of the navigable season of the Upper Mississippi, or for about six months in the year, and is amply sufficient, being in fact nearly as much water as there is in the larger stream at a corresponding stage. Any increase of this minimum depth would greatly augment the cost of the proposed improvement, as may be seen by reference to the 2-foot curves drawn on the map.

I would, then, respectfully propose—

1st. The excavation by dredging of a channel 80 feet wide, and of a minimum depth of 2 feet at low-water, through the 4 shoals in the Cuivre River. As there is no perceptible current and but very little sediment in this part of the river, and the material of the bottom and shores being generally of a comparatively stable nature, it is believed that no additional work would be necessary for many years. A comparison of the map of this survey with the report on the survey of 1871 shows but a trifling enlargement of the bars during the intervening period.

2d. The excavation by dredging of a channel 100 feet in width and of a minimum dept of 2 feet at low-water through the three sand-bars, in the upper part of Cuivre Slough. An additional width of 20 feet is given, as the material is less stable, and the cut is more liable to be filled with shifting sand. It is believed, however, that the work will be reasonably permanent, and that a few days' dredging each year will suffice to keep the passage open.

3d. The construction of a dam across the lower part of Cuivre Slough, 2,600 feet from the foot of Cuivre Island. The dam will be about 450 feet long, constructed of brush and rock, with its crest 6 feet above low-water mark. With the necessary shore protections it will contain about 3,000 cubic yards of material, and, estimating for this quantity placed in position at $1.50 per cubic yard, will cost about $4,500. This dam will be of much benefit during the low stages by backing up the water in the slough and river, and by checking the current will prevent in great measure the filling up of the upper portion of the slough by sand from the Mississippi.

4th. The removal of snags, wrecks, and overhanging timber. The estimate for this work is $1,000.

The location of all the proposed work is shown on the map.

Dredging estimate.

No.	Name.	Distance from channel of Mississippi.	Length of proposed cut.	Average depth of excavation.	Cubic yards (at 50 cents per yard).	Cost.
		Miles.	*Feet.*	*Feet.*		
1	Cuivre Slough Bar No. 1	0.5	700	1.5	3,888	$1,944
2	Cuivre Slough Bar No. 2	1.5	900	1.5	5,000	2,500
3	Cuivre Slough Bar No. 3	1.8	850	2.0	6,296	3,148
4	Morrison's Bar	10.0	550	1.5	2,444	1,222
5	Shelton Bar	10.2	850	2.5	6,296	3,148
6	Flood's Bar	12.0	850	1.0	2,518	1,259
7	Seed Tick Island Bar	16.5	2,000	3.0	17,778	8,889
	Total				44,220	22,110

SUMMARY.

Dredging and removal of 44,220 cubic yards sand and gravel, at 50 cents	$22,110
Dam across Cuivre Slough	4,500
Removal of snags, wrecks, &c	1,000
Engineering contingencies, &c	2,390
Total estimate	30,000

These figures provide for the improvement of the upper part of Cuivre Slough and of Cuivre River to Chain of Rocks, a distance of 16½ miles.

Very respectfully, your most obedient servant,

C. W. DURHAM,
Assistant Engineer.

Capt. A. MACKENZIE,
Corps of Engineers, U. S. A.

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